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EXAMINER
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LI, SHI K

ART UNIT	PAPER NUMBER
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2633

DATE MAILED: 01/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/005,998

Applicant(s)

ISLAM, MOHAMMED N.

Examiner

Shi K. Li

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 37-39 and 42-44 is/are allowed.
- 6) ☒ Claim(s) 1-14, 16-19, 21, 23-33, 40, 41 and 45-49 is/are rejected.
- 7) ☒ Claim(s) 15, 20, 22 and 34-36 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 40-41 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 40 recites the limitation "wherein the plurality of selecting elements comprise a plurality of tunable scheduler transmitters" in lines 1-3 of the claim. It is unclear whether "the plurality of selecting elements" refers to "a plurality of scheduler selecting elements" recited in line 7 of claim 38.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-2, 11-13, 16-17 and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Beshai et al. (U.S. Patent Application Pub. 2002/0083195 A1).

Regarding claims 1 and 17, Beshai et al. discloses in FIG. 3 an apparatus comprising source nodes 120, crossconnects 330, core nodes 240 (together, they correspond to scheduling

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star switching fabric of instant claim), and crossconnects 350 (equivalent to transmission star switching fabric of instant claim). Beshai et al. teaches in FIG. 12 structure of the core nodes, which includes segment scheduler 1220 and data buffer 1242 (equivalent to selecting elements of instant claim) for balancing load among channels and, therefore, packets delivered to the crossconnects 350 have a more uniform distribution than packets receiver by crossconnects 330.

Regarding claim 2, Beshai et al. illustrates in FIG. 7 divider for sending traffic from source node 120 to crossconnect via a plurality of paths.

Regarding claims 11-13 and 25, Beshai et al. teaches in paragraph [0130] round robin scheduling scheme. Inherently, a round robin scheme selects a (next) wavelength different from the previous wavelength that has been selected.

Regarding claim 16, Beshai et al. teaches in FIG. 6 smearing of input packets, which includes buffers as illustrated in FIG. 17.

5. Claims 1-4, 6, 14 and 17-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Ge et al. (U.S. Patent Application Pub. 2002/0018263).

Regarding claims 1 and 17, Ge et al. discloses in FIG. 1 an optical router comprising a pre-amp, splitters 16, splitters 51, space switch blocks 18 (together, they correspond to scheduling star switching fabric of instant claim), and broadcast and select switches 26 (equivalent to transmission star switching fabric of instant claim). Ge et al. teaches in FIG. 2 selecting elements 53 and 58. Ge et al. teaches in paragraph [0046] that the control unit 20 to evenly distribute the traffic for maximizing the efficiency and utilization of the broadcast and select switches.

Regarding claims 2-4, Ge et al. teaches in FIG. 1 cascade 1xn splitter.

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Regarding claim 6, Ge et al. teaches in FIG. 1 that the signal divider 16 is coupled to an optical amplifier 14.

Regarding claim 14, Ge et al. teaches in FIG. 3 intermediate buffer 74 between the scheduling switch fabric and transmission switching fabric.

Regarding claim 18, Ge et al. teaches in FIG. 1 that fiber 12 carries WDM signals 11. That is Ge et al. teaches packets of different wavelengths.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ge et al. (U.S. Patent Application Pub. 2002/0018263) in view of Miles et al. (U.S. Patent 6,665,495 B1).

Ge et al. has been discussed above in regard to claims 1-4, 6 and 14. Although Ge et al. does not teach explicitly a combiner for combining a plurality of wavelength signals, Ge et al. teaches in FIG. 1 that fiber 12 carries WDM signals 11. It is understood that a WDM signal is created by combining a plurality of wavelength signals. Therefore, it would have been obvious, if not inherent, to provide a combiner for combining a plurality of wavelength signals to form WDM signals. To strengthen his argument, the examiner cites Miles et al. which teaches in FIG. 12a DWDM MUX (equivalent to combiner of instant claim) for combining a plurality of wavelength to form WDM signals. One of ordinary skill in the art would have been motivated to combine the teaching of Miles et al. with the apparatus of Ge et al. because a MUX allows the

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sharing of a single fiber by a plurality of wavelength channels and reduces cost and complexity for connection between components. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use MUX to combine a plurality of wavelength channels to form WDM signals, as taught by Miles et al., in the apparatus of Ge et al. because it reduces cost and complexity for connection between components.

8. Claims 7-10, 19, 21, 23-24, 26-28 and 30-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ge et al. (U.S. Patent Application Pub. 2002/0018263) in view of Lee et al. (U.S. Patent 6,538,784 B1).

Ge et al. has been discussed above in regard to claims 1-4, 6, 14 and 17. Regarding claims 7 and 21, the difference between Ge et al. and the claimed invention is that Ge et al. does not teach tunable filters. Lee et al. teaches in FIG. 5A routing module that is similar to the routing module of FIG. 2 of Ge et al., which comprises demultiplexer 56, path modules 58 and multiplexer 62. Lee et al. teaches several design choices for the path modules. These choices include on/off switch, semiconductor optical amplifier (SOA) and tunable filter. Ge et al. teaches in paragraph [0043] the use of on/off switch and SOA. As taught by Lee et al., on/off switch, SOA or tunable filter are interchangeable for use as path module in a routing module. Where the claimed differences involve the substitution of interchangeable or replaceable equivalents and the reason for the selection of one equivalent for another was not to solve an existent problem, such substitution has been judicially determined to have been obvious. See *In re Ruff*, 118, USPQ 343 (CCPA 1958). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to replace on/off switch or SOA with tunable filter.

Regarding claim 8, Ge et al. suggests in FIG. 2 that the selecting element and the scheduling switching fabric form an integral module.

Regarding claim 9, Lee et al. teaches in FIG. 7A routing module which is equivalent to the routing module of FIG. 2 of Ge et al. which comprises demultiplexer 56, path modules 58 and multiplexer 62. Lee et al. teaches in FIG. 7B through FIG. 7G several design choices for the path modules. These choices include tunable filter and tunable wavelength converter 772. A tunable wavelength converter includes a tunable transmitter with modulator. Where the claimed differences involve the substitution of interchangeable or replaceable equivalents and the reason for the selection of one equivalent for another was not to solve an existent problem, such substitution has been judicially determined to have been obvious. See *In re Ruff*, 118, USPQ 343 (CCPA 1958). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to replace the routing module of Ge et al. with the routing module of FIG. 7A of Lee et al.

Regarding claims 10, Lee et al. teaches that the selecting elements 78 of FIG. 3 of Ge et al. can be replaced by tunable filters which have equivalent function.

Regarding claim 19, Lee et al. teaches that the selecting elements 78 of FIG. 3 of Ge et al. can be replaced by tunable transmitters which have equivalent function.

Regarding claims 23-24, the art for placing the tunable optical filter in a line card or within a switch fabric is well known in the art, and where to place the tunable optical filter is obvious to one of ordinary skill in the art as a design choice.

Regarding claims 26-27 and 31, the modified optical router of Ge et al. and Lee et al. comprises a scheduling switching fabric with tunable filters for selecting and forward packets of

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particular wavelengths to a transmission switch fabric. It has been established above that replacing selecting elements 78 and 84 of FIG. 3 Ge et al. by tunable filters is obvious.

Therefore, the transmission switching fabric of the modified optical router also contains tunable filters. Ge et al. teaches in paragraph [0046] that the control unit 20 to evenly distribute the traffic for maximizing the efficiency and utilization of the broadcast and select switches.

Regarding claim 28, Ge et al. teaches in FIG. 1 splitters.

Regarding claim 30, Ge et al. teaches in FIG. 1 amplifier 14.

Regarding claims 32-33, it has been established above that replacing the selective elements 58 of FIG. 2 of Ge et al. with tunable transmitters or tunable filter is obvious.

9. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ge et al. and Lee et al. as applied to claims 7-10, 19, 21, 23-24, 26-28 and 30-33 above, and further in view of Miles et al. (U.S. Patent 6,665,495 B1).

Ge et al. and Lee et al. have been discussed above in regard to claims 7-10, 19, 21, 23-24, 26-28 and 30-33. Although Ge et al. does not teach explicitly a combiner for combining a plurality of wavelength signals, Ge et al. teaches in FIG. 1 that fiber 12 carries WDM signals 11. It is understood that a WDM signal is created by combining a plurality of wavelength signals. Therefore, it would have been obvious, if not inherent, to provide a combiner for combining a plurality of wavelength signals to form WDM signals. To strengthen his argument, the examiner cites Miles et al. which teaches in FIG. 12a DWDM MUX (equivalent to combiner of instant claim) for combining a plurality of wavelength to form WDM signals. One of ordinary skill in the art would have been motivated to combine the teaching of Miles et al. with the modified apparatus of Ge et al. and Lee et al. because a MUX allows the sharing of a single fiber by a



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plurality of wavelength channels and reduces cost and complexity for connection between components. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use MUX to combine a plurality of wavelength channels to form WDM signals, as taught by Miles et al., in the modified apparatus of Ge et al. and Lee et al. because it reduces cost and complexity for connection between components.

10. Claims 45-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doerr et al. (U.S. Patent 6,532,090 B1) in view of Yamada et al. (E. Yamada et al., "150 Channel Supercontinuum CW Optical Source with high SNR and Precise 25 GHz Spacing for 10 Gbit/s DWDM Systems", Electronics Letters, Vol. 37, No. 5, 1<sup>st</sup> March 2001) and Hinds et al. (U.S. Patent 6,920,287 B1).

Regarding claim 45, Doerr et al. discloses in FIG. 7 a crossconnect apparatus comprising a plurality of wavelength interchangers (WI) 701, splitters 703 for generating a plurality of substantially similar sets of signals received and a plurality of multi-wavelength filters (MWF) 704. Doerr et al. teaches in FIG. 6B that a wavelength interchanger optical transmitters 613. The difference between Doerr et al. and the claimed invention is that Doerr et al. does not teach a common bay equipment with unmodulated optical signal. Yamada et al. teaches in FIG. 1 a multi-wavelength generator for providing a large number of unmodulated wavelength channels for transmitters. One of ordinary skill in the art would have been motivated to combine the teaching of Yamada et al. with the crossconnect apparatus of Doerr et al. because it produces unmodulated optical signal with high signal-to-noise ration (SNR) and precise spacing for DWDM transmission. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a common source for generating a large number of

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unmodulated optical source, as taught by Yamada et al., in the crossconnect apparatus of Doerr et al. because it produces unmodulated optical signal with high SNR and precise spacing for DWDM transmission.

The combination of Doerr et al. and Yamada et al. still fails to teach a common bay equipment. However, shelving equipment in bay is normally expected for communication equipment. For example, Hinds et al. teaches in FIG. 1 a common bay. Hinds et al. teaches in col. 1, lines that an equipment bay allows upgrades and reconfigurations to be accomplished by adding or re-arranging individual circuit packs. One of ordinary skill in the art would have been motivated to combine the teaching of Hinds et al. with the modified crossconnect apparatus of Doerr et al. and Yamada et al. and put unmodulated optical source in a common bay because equipment bay allows upgrades and reconfigurations to be accomplished by adding or re-arranging individual circuit packs. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a common bay to house circuit pack that contains unmodulated optical source, as taught by Hinds et al., in the unmodulated optical source in a common bay because equipment bay allows upgrades and reconfigurations to be accomplished by adding or re-arranging individual circuit packs.

Regarding claim 46, Yamada et al. teaches in FIG. 1 mode-locked laser, continuum generator, and AWG demultiplexer.

Regarding claim 47, Yamada et al. teaches in FIG. 1 EDFA coupled to polarization-maintaining normal dispersion-flatted fiber (PM-DFF) as continuum generator.

Regarding claim 48-49, Doerr et al. teaches in FIG. 4a filter using tunable grating and in FIG. 4b filter of fixed wavelength. Yamada et al. teaches in FIG. 1 AWG demultiplexer corresponding to wavelength selector of instant claim.

***Allowable Subject Matter***

11. Claims 15, 20, 22 and 34-36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
12. Claims 37-39 and 42-44 are allowed.
13. Claims 40-41 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shi K. Li whose telephone number is 571 272-3031. The examiner can normally be reached on Monday-Friday (8:30 a.m. - 5:00 p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

skl  
4 January 2006



**Shi K. Li**  
**Patent Examiner**